

### ABSTRACT

Described are methods for protecting the female reproductive system against natural and artificial insults by administering to women a composition comprising an agent that antagonizes one or more acid sphingomyelinase (*ASMase*) gene products. Specifically, methods disclosed herein serve to protect women's germline from damage resulting from cancer therapy regimens including chemotherapy or radiotherapy. In one aspect, the method preserves, enhances, or revives ovarian function in women, by administering to women a composition containing sphingosine-1-phosphate, or an analog thereof. Also disclosed are methods to prevent or ameliorate menopausal syndromes and to improve *in vitro* fertilization techniques.

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